10/069823 .091402
JC10 Rec'd PCT/PTO 21 FEB 2002

FORM PTO-1390 (REV. 1-2000)	U S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	ATTORNEY'S DOCKET NUMBER 27795-00027
		U S APPLICATION NO. (If known, see 37 CFR 1.5) 10/069823 Not Yet Known
INTERNATIONAL APPLICATION NO. PCT/AU00/01070	INTERNATIONAL FILING DATE September 8, 2000	PRIORITY DATE CLAIMED September 9, 1999

TITLE OF INVENTION
Information Transmission Rate Control Across a Core Network

APPLICANT(S) FOR DO/EO/US
Leslie Gary GRAF et al

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. X This is a **FIRST** submission of items concerning a filing under 35 U S C. 371.

2 ___ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U S.C 371

3. X This is an express request to begin national examination procedures (35 U.S C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1)

4. X A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. X A copy of the International Application as filed (35 U.S C. 371(c)(2))

   a X is transmitted herewith (required only if not transmitted by the International Bureau).
   b ___ has been transmitted by the International Bureau
   c. ___ is not required, as the application was filed in the United States Receiving Office (RO/US)

6. ___ A translation of the International Application into English (35 U.S C. 371(c)(2)).

7. ___ Amendments to the claims of the International Application under PCT Article 19 (35 U S C 371(c)(3))
   a. ___ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ___ have been transmitted by the International Bureau.
   c. ___ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ___ have not been made and will not be made.

8 ___ A translation of the amendments to the claims under PCT Article 19 (35 U S C. 371(c)(3)).

9. X An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) **(Un-Executed)**

10. ___ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5))

Items 11. to 16. below concern other document(s) or information included:

11 X An Information Disclosure Statement under 37 CFR 1.97 and 1 98.

12. ___ An assignment document for recording A separate cover sheet in compliance with 37 CFR 3 28 and 3 31 is included

13 ___ A FIRST preliminary amendment.

14. ___ A SECOND or SUBSEQUENT preliminary amendment.

15. ___ A substitute specification.

16 ___ A change of power of attorney and/or address letter.

17. ___ A computer-readable form of the sequence listing in accordance with PCT Rule 13 2 and 35 U.S.C. 1.821 - 1.825.

18. ___ A second copy of the published international application under 35 U.S.C. 154(d)(4).

19 ___ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).

20. X Other items or information:

Copy of the International Search Report as prepared by the Australian Patent Office,
Copy of International Preliminary Examination Report; and
Postcard Acknowledgment.

EL811690820US

U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 10/069823 Not Yet Known	INTERNATIONAL APPLICATION NO. PCT/AU00/01070	ATTORNEY'S DOCKET NUMBER 27795-00027

17. X The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1,040.00		
International preliminary examination fee NOT paid to USPTO but International Search Report prepared by the EPO or JPO $890.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search fee (37 CFR 1.445(a)(2)) paid to USPTO $710.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $690.00		
International preliminary examination fee (37CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 1040	
Surcharge of **$130.00** for furnishing the oath or declaration later than ___ 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(e))		

Claims	Number Filed	Number Extra	Rate		
Total Claims	59- 20 =	39	x $18.00	$ 702	
Independent Claims	5- 3 =	2	x $84.00	$ 168	
Multiple dependent claims(s) (if applicable)			+ $280.00	$ 280	
			TOTAL OF ABOVE CALCULATIONS =	$ 2190	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1 9, 1.27, 1.28).				$	
			SUBTOTAL =	$ 2190	
Processing fee of **$130.00** for furnishing the English translation later the ___20 ___30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
			TOTAL NATIONAL FEE =	$ 2190	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$	
			TOTAL FEES ENCLOSED =	$ 2190	
				Amount to be: refunded	$
				charged	$

a. X A check in the amount of $2190 to cover the above fees is enclosed.
b. ___ Please charge my Deposit Account No. **10-0447** in the amount of $ to cover the above fees A duplicate copy of this sheet is enclosed.
c. X The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **10-0447**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Stanley R. Moore, Esq.
Jenkens & Gilchrist, P.C.
3200 Fountain Place
1445 Ross Avenue
Dallas, Texas 75202-2799
214/855-4500

23932
PATENT TRADEMARK OFFICE

Stanley R. Moore
SIGNATURE

Stanley R Moore
NAME

26,958
REGISTRATION NUMBER

INFORMATION TRANSMISSION RATE CONTROL ACROSS A CORE NETWORK

FIELD OF INVENTION

The present invention relates generally to the information transmission rate between telecommunications nodes. In one aspect, the present invention relates to the control of the rate at which information is transmitted across a core network, and in particular to the control of the rate at which information is transmitted to and from endpoints in access networks separated by a core network. The invention is suitable, in one aspect, for use in the transmission of voice information to and from mobile terminals in third-generation mobile access networks across an ATM core network and it will be convenient to hereinafter describe the invention in relation to that exemplary application. It should be appreciated, however, that the invention is not limited to that application, only.

BACKGROUND OF INVENTION

The evolution of mobile communications systems and broadband multi-service networks are generally expected to merge in third-generation mobile systems that will provide global multimedia access to the mobile user. The concept referred to in Europe as the Universal Mobile Telecommunication System (UMTS) and globally as International Mobile Telecommunications in the year 2000 (IMT-2000) includes high-level access to multimedia services and evolution from second-generation mobile systems as key components. Standardization of this new system is carried out mainly by the 3rd Generation Partnership Project (3GPP) and the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T).

UMTS / IMT-2000 separates the access functionality from the core network functionality, providing a common core network to support various types of access networks. Access networks provide core-network-technology-independent access platforms for mobile and other terminals to all core networks and network services. In order to support the convergence of fixed and mobile telecommunications networks, a common core network for both fixed and mobile access is envisaged.

Bandwidth at the air interface in the mobile access networks, which can vary greatly during calls, remains a limiting factor in the volume of information that can be transmitted to and from the wireless mobile terminals

SUMMARY OF INVENTION

It would therefore be desirable to provide means for facilitating convergence of transmission of information between various nodes in access networks separated by a core network.

In one aspect the present invention provides in a telecommunication system having, a core network and a plurality of access nodes in communication with the core network, an information rate control function means adapted to authorise and/or establish a communication rate for transmission of information including:

determining means for determining a plurality of maximum information transmission rates along a path of communication established between the plurality of access nodes;

selecting means for selecting a lowest one of the plurality of maximum information transmission rates, and;

authorising and/or establishing means for authorising and/or establishing communication at a rate no greater than the selected lowest rate.

In another aspect the present invention provides a method of authorising and/or establishing a communication rate for transmission of information in a telecommunication system having a core network and a plurality of access nodes in communication with the core network, including the steps of:

determining a plurality of maximum information transmission rates along a path of communication established between the plurality of access nodes;

selecting a lowest one of the plurality of maximum information transmission rates, and;

authorising and/or establishing communication at a rate no greater than the selected lowest rate.

Unfortunately, the core network transport protocols of prior art systems, do not currently enable the comparison of the current maximum transmission rate supported by two air interfaces so that the transmission rate of information

between mobile terminals or other endpoints within separated access networks cannot be optimized.

Therefore, in essence, the present invention stems from the realisation that a common core/backbone network can support fixed and/or mobile access by introducing a functionality that provides a communication rate for transmission based on a selection of the lowest maximum transmission rate in the communication. The maximum rate of transmission of information between wireless mobile terminals, for instance, is the current maximum transmission rate supported by whichever of the two associated air interfaces is the most congested.

Preferably, the communication rate is dynamically authorised and/or established during a communication session.

Preferably, wherein the communication rate is authorised and/or established at, or prior to, set up of a communication session.

Preferably, the information rate control function means is located in the access nodes.

Preferably, the information rate control function means is located in the core network.

Preferably, the information rate control function means operates in a Service Specific Convergence Sublayer of an AAL2 Adaption layer in the core network.

Preferably, the information rate control function means operates in an RTP Transport layer in the core network.

A communication system including the invention may include at least two access nodes communicating with endpoints, wherein the path of communication includes endpoint to endpoint communication.

One or more of the access nodes may be located in a radio access network. The radio access network may be a second or third generation cellular access network. At least one of the access nodes may be a radio network controller in a UMTS access network. One or more endpoints may be located in a Public Land Mobile Network PLMN. At least one of the endpoints may be a wireless MS.

The core network preferably includes a UMSC for mapping messages into an Iu framing protocol for transport in the UMTS access network.

One or more of the access nodes may be located in a fixed access network, such as, for example, a PSTN, ISDN, or a PSTN/ISDN access network.

In one embodiment of the invention, the plurality of maximum information transmission rates are communicated across the core network as messages within I.366.2 Type 3 cells of an ATM AAL2 protocol.

In another embodiment of the invention, the plurality of maximum information transmission rates are communicated across the core network as messages within RTP packets of an IP protocol.

In another aspect the present invention provides a method for controlling the rate of information transmission between first and second endpoints which communicate with each other via access networks separated by a core network, information transmission to and from said first and second endpoints being respectively set by first and second telecommunications nodes, said first and second endpoints communicating with one of said access networks respectively across first and second interfaces, at least one of said interfaces having a variable maximum information transmission rate, the method including the steps of:

(a) said first and second telecommunications nodes respectively signalling to a remote node the maximum information transmission rate able to be supported by said first and second interfaces;

(b) comparing the maximum information transmission rates that can be supported by said first and second air interfaces; and

(c) setting the information transmission rate of each endpoint to not exceed that of the lower of the maximum information transmission rates.

Preferably, the remote node signalled by each of said first and second telecommunications nodes is the other of said first and second telecommunications nodes, the comparison of maximum information transmission rates being carried out in each of said first and second telecommunications nodes.

At least one endpoint may include a codec, wherein step (c) includes setting the rate of operation of the codec to the lower of the maximum information transmission rates.

In one embodiment of the invention, the core network may be an ATM core network. The ATM core network may include a Type 2 Adaptation layer. The Type 2 Adaptation layer may include an I.366.2 Service Specific Convergence Sub-Layer. I.366.2 Type 3 cells may be used to carry rate control information messages from each telecommunications node.

In another embodiment of the invention, the core network may be an IP network. The IP core network may include an RTP transport layer. RTP packets may be used to carry rate control information messages to and from each telecommunications node.

At least one of the interfaces may be an air interface. One or more of the access networks may be a radio access network, such as a UMTS access network. At least one of the telecommunications nodes may be a radio network controller forming part of the UMTS network. At least one of the endpoints may be a wireless mobile terminal. The core network may include a UMSC that acts to map rate control information into an Iu framing protocol for transport in the UMTS access network.

One or more interfaces may alternatively be associated with a fixed access network, such as a PSTN/ISDN network. At least one telecommunications node may be, for example, a transcoder forming part of the fixed access network. At least one of the endpoints may be a fixed network terminal.

A further aspect of the present invention provides a telecommunications system including one or more access networks connected to a core network, first and second endpoints which communicate with each other via said access networks across said core network, information transmission to and from said first and second endpoints being respectively set by first and second telecommunications nodes, said first and second endpoints communicating with one of said access networks respectively across first and second interfaces, at least one of said interfaces having a variable maximum information transmission rate, wherein

said first and second telecommunications nodes respectively act to signal to a remote node the maximum information transmission rate able to be supported by said first and second interfaces, said remote node acting to compare the maximum information transmission rates that can be supported by said first and second interfaces, and wherein

the first and second telecommunications nodes respectively act to set the information transmission rate to and from said first and second endpoints to not exceed that of the lower of the maximum information transmission rates.

Yet another aspect of the present invention provides a first telecommunications node for use in a telecommunications system including a core network, one or more access networks connected to said core network, and a second endpoint, said first and second endpoints communicating with each other via said access networks across said core network, information transmission to and from said first and second endpoints being respectively set by first and second telecommunications nodes, said first and second endpoints communicating with one of said access networks respectively across first and second interfaces, at least one of said interfaces having a variable maximum information transmission rate, wherein

said first telecommunications node acts to signal to a remote node the maximum information transmission rate able to be supported by said first interface, said remote node acting to compare the maximum information transmission rates that can be supported by said first and second air interfaces, and wherein

the second telecommunications node acts to set the information transmission rate of said second endpoint to not exceed that of the lower of the maximum information transmission rates.

BRIEF DESCRIPTION OF DRAWINGS

The following description refers in more detail to the various features of the present invention. To facilitate an understanding of the invention, reference is made in the description to the accompanying drawings where the invention is illustrated in a preferred embodiment. It is to be understood, however, that the invention is not limited to the preferred embodiment as illustrated in the drawings.

In the drawings:

Figure 1 is a schematic diagram illustrating a cellular system including an ATM core network interconnecting fixed and mobile access networks;

Figure 2 is a timing diagram showing the exchange of rate control information between mobile terminals communicating with the mobile access networks of Figure 1; and

Figure 3 is a schematic diagram showing the structure of a CPS-Cell used to transport rate control information messages between UMSC's over the AAL2 core network of Figure 1.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to Figure 1, there is shown generally a schematic representation of a third-generation cellular system 1 including an ATM core network 2 which has two parallel UMTS radio access networks 3 and 4 linked to it. Additionally, two fixed networks are linked to the ATM core network 2, namely a PTSN/ISDN+ network 5 and an internet/intranet+ network 6. The core network 2 acts to transport information between telecommunications nodes or endpoints forming part of or in communication with any of the networks 3 to 6.

The ATM core network 2 includes at least a first Universal Mobile Telecommunications System Mobile Switching Center (UMSCa) 7 connected to the UMTS radio access network 3 across an Iu-interface. The UMTS radio access network 3 includes at least a first Radio Network Controller (RNCa) 8 and Base Stations (BS) 9 connected to them. Mobile Terminals 10 communicate with the Base Stations 9 across an air interface 11. Similarly, the ATM core network 2 also includes at least a second Universal Mobile Telecommunications System Mobile Switching Center (UMSCb) 12 connected to the UMTS radio access network 4 across an Iu-interface. The UMTS radio access network 4 includes at least a first Radio Network Controller (RNCb) 13 and Base Stations (BS) 14 connected to them. Mobile Terminals 15 communicate with the Base Stations 14 across an air interface 16.

The Base Stations 9 and 14 contain equipment for transmission and reception of information to and from the Mobile Terminals 10 and 15, as well as equipment for encryption/decryption, signal strength measurement and for

communication with the Radio Network Controllers 8 and 13. The Radio Network Controllers 8 and 13 set up radio channels for voice and other traffic and for signaling to the UMSCs 7 and 12, and monitor the access network portion of connections established. Notably, the Radio Network Controllers 8 and 13 respectively control the air interface resources, and monitor the availability of those resources, for calls made using the Mobile Terminals 10 and 15. The UMSCs 7 and 12 serve as an interface to the ATM core network 2 and beyond to other access networks, and control the operation of the Radio Network Controllers 8 and 13. Each of the Mobile Terminals 10,15 includes a Coder-Decoder (Codec) for converting analog sound, speech or video to and from digital information suitable for transport across a first of the access networks 3 to 6, the ATM core network 2 and finally a second of the access networks 3 to 6.

The digital information is transported to and from one of the Mobile Terminals 10 to one of the Mobile Terminals 15 across the ATM core network 2. In this example, the ATM core network 2 uses the ATM Adaptation Layer Type 2 (AAL2) transmission protocol. The AAL2 transmission protocol provides for bandwidth-efficient transmission of low-rate, short and variable length cells in delay sensitive applications, and is divided into a Common Part Sub-Layer (CPS) and a Service Specific Convergence Sub-Layer (SSCS). The purpose of the SSCS is to convey narrow-band calls consisting of voice, voiceband data, or circuit mode data. Different SSCSs have been defined to support specific AAL2 user services, or groups of services. One such SSCS is defined in the ITU-T Recommendation I.366.2, otherwise known as I.trunk.

The desired encoding-decoding rate of information content can vary dramatically during a call. For example, upon detection of voiceband data traffic, it may be desirable to increase the rate of operation of the Codecs from a nominal to a higher rate in order to accommodate the voiceband data. If facsimile traffic is detected and facsimile encoding and decoding is supported by the Mobile Terminals 10,15, the rate of operation of the Codecs may be further altered. Similarly, some voice or other information encoding algorithms are adaptive by nature and can use different information transmission rates depending upon the availability of network resources. It is therefore important to be able to adapt the

information transmission rate to an optimal setting depending upon the Codec used and the information content transmitted between Mobile Terminals.

In accordance with the invention, the maximum information transmission rate is determined by the most congested link in the connections between one of the Mobile Terminals 10 and one of the Mobile Terminals 15, namely the air interfaces 11 and 16. During call set-up, each of the Radio Network Controllers 8 and 13 determines the maximum information transmission rate that the Codec of the remote Mobile Terminal must not exceed. As seen in Figure 2, a rate control message containing this maximum information transmission rate is sent, at step 20, from each Radio Network Controller 8,13 to its corresponding UMSC 7,12.

For UMTS, the 3rd Generation Partnership Project is currently developing the Iu-interface between RNCs and UMSCs. This framing protocol includes a rate control mechanism. The maximum information transmission rate contained in the rate control mechanism sent across the Iu-interface is received at each UMSC 7 and 12 – sent respectively from the RNCs 8 and 13 – and mapped into an I.366.2 cell. By way of example, an I.366.2 Type 3 cell 30 is shown in Figure 3. The I.366.2 Type 3 cell 30 includes a cell header 31, a payload 32, a message type field 33 and a cyclic redundancy check (CRC) field 34. The I.366.2 SSCS makes explicit use of the User-to-User Indication (UUI) and implicit use of the Length Indicator (LI) contained in the cell header 31 to route the cell 30 across the ATM core network 2 between UMSCa 7 and UMSCb 12. The maximum information transmission rate contained in the rate control mechanism sent across the Iu-interface is mapped into the payload 32, and a Rate Control Function code is created in the message type field 33. The entire payload is protected by the 10-bit CRC.

At step 21, when the UMSCb 12 receives a cell 30 sent from the UMSCa 7, the UMSCb 12 detects the presence of a Rate Control Function code in the message type field 33 and then maps the payload of the cell 30 into the rate control message of the Iu framing protocol for transport across the Iu-interface to the Radio Network Controller 13. Similarly, when the UMSCa 7 receives a cell 30 sent from the UMSCb 12, the UMSCa 7 detects the presence of a Rate Control Function code in the message type field 33 and then maps the payload of the cell

30 into the rate control message of the Iu framing protocol for transport across the Iu-interface to the Radio Network Controller 8.

Each Radio Network Controller then uses this rate control message received from the remote Radio Network Controller to control the operation of the Codec of its associated Mobile Terminal by comparing the maximum information transmission rate that can be supported by the air interfaces 11 and 16, and then controlling the rate of operation of that Codec to not exceed the lower of the two maximum information transmission rates.

If a change in the radio channel capacity across one of the air interfaces 11, 16 is detected during the connection, the maximum information transmission rate of both Mobile Terminals may be altered. For example, if an altered radio channel capacity is detected across the air interface 11, in step 22, the Radio Network Controller 8 is able to compare the previously received maximum information transmission rate across the air interface 16 from the remote Radio Network Controller with the newly detected received maximum information transmission rate of the air interface 11, and adjust the rate of operation to the Codec of its associated Mobile Terminal to not exceed the lower of the two maximum information transmission rates.

At the same time, at step 23, the newly detected maximum information transmission rate across the air interface 11 is included in the rate control mechanism of the Iu framing protocol and sent from the RNCa 8 across the Iu-interface to the UMSCa 7. This rate is then mapped into an I.366.2 Type 3 cell 30 and sent from the UMSCa 7 to the UMSCb 12. Upon detection at the UMSCb 12 of the presence of a Rate Control Function code in the message type field 33, the payload of the cell 30 is mapped into the rate control message of the Iu framing protocol for transport across the Iu-interface to the RNCb. That Radio Network Controller then uses this rate control message to compare the maximum information transmission rate that can now be supported by the air interfaces 11 and 16, and controls the rate of operation of the Codec of its associated Mobile Terminal to not exceed the lower of the two maximum information transmission rates.

It should be understood that various modifications and/or additions may be made to the aforementioned method and system for controlling information transmission rate without departing from the ambit of the present invention.

In that regard, the cellular system shown in Figure 1 may include elements of second and/or third generation cellular systems, such as a GSM, D-AMPS, IS-136 or other radio access networks. Moreover, whilst a Type 2 Adaptation Layer is used in the exemplary ATM core network 2 described above, it is envisaged that other types of ATM adaptation layers may be used with the invention.

Other types of core networks may also be used in relation to the invention. For example, the core network 2 may instead be an Internet Protocol (IP) core network (i.e. a network having an IP network-layer protocol). The transport layer of the IP network may conform to the Real Time Transport-Layer Protocol (RTP). RTP is a framing protocol developed for transporting real-time data across IP networks and designed to be independent of the underlying transport and network layers.

Rate Control Messages sent from the RNCs 8,13 to the UMSCs 7,12 may be mapped into an RTP or RTP Control Protocol (RTCP) packet. An RTP packet includes a fixed RTP header and the payload. The RTP header includes a payload type (PT) field. The maximum information transmission rate contained in the rate control mechanism of the access networks of Figure 1 may be mapped into the RTP packet payload, and a Rate Control Function code created in the PT field of the RTP header, for transport across an IP core network.

Moreover, access networks communicating with endpoints other than the Mobile Terminals 10,15, and including telecommunications nodes other than RNCs 8,13, may be envisaged. For example, at least one telecommunications node may be a transcoder at the boundary between the core network 2 and the PSTN/ISDN access network 5.

The skilled addressee will appreciate that various other types and combinations of access networks and core networks, and mechanisms for transporting rate control messages across such core networks, may be used in the context of the invention.

CLAIMS

1. In a telecommunication system having, a core network and a plurality of access nodes in communication with the core network, an information rate control function means adapted to authorise and/or establish a communication rate for transmission of information including:

determining means for determining a plurality of maximum information transmission rates along a path of communication established between the plurality of access nodes;

selecting means for selecting a lowest one of the plurality of maximum information transmission rates, and;

authorising and/or establishing means for authorising and/or establishing communication at a rate no greater than the selected lowest rate.

2. An information rate control function means as claimed in claim 1, wherein the communication rate is dynamically authorised and/or established during a communication session.

3. An information rate control function means as claimed in claim 1, wherein the communication rate is authorised and/or established at, or prior to, set up of a communication session.

4. An information rate control function means as claimed in claim 1, 2 or 3, wherein the information rate control function means is located in the access nodes.

5. An information rate control function means as claimed in claim 1, 2 or 3, wherein the information rate control function means is located in the core network.

6. An information rate control function means as claimed in claim 5, wherein the information rate control function means operates in a Service Specific Convergence Sublayer of an AAL2 Adaption layer in the core network.

7. An information rate control function means as claimed in claim 5, wherein the information rate control function means operates in an RTP Transport layer in the core network.

8. A communication system including the information rate control function means of any one of the previous claims.

9. A communication system as claimed in claim 8, wherein the core network is an ATM network.

10. A communication system as claimed in claim 9, wherein the ATM network includes an AAL2 Adaption layer.

11. A communication system as claimed in claim 10, wherein the AAL2 Adaption layer includes an I.366.2 Service Specific Convergence Sublayer.

12. A communication system as claimed in claim 8, wherein the core network is an IP network.

13. A communication system as claimed in claim 12, wherein the IP network includes an RTP Transport layer.

14. A communication system as claimed in any one of claims 8 to 13, further including at least two access nodes communicating with endpoints, wherein the path of communication includes endpoint to endpoint communication.

15. A communication system as claimed in claim 14, further including an interface between each access node and respective endpoints.

16. A communication system as claimed in claim 15, wherein at least one interface includes a variable maximum information transmission rate.

17. A communication system as claimed in claim 16, wherein the at least one interface is an air interface.

18. A communication system as claimed in any one of claims 8 to 17, wherein one or more of the access nodes is located in a radio access network.

19. A communication system as claimed in claim 18, wherein the radio access network is a second or third generation cellular access network.

20. A communication system as claimed in any one of claims 14 to 19, wherein at least one endpoint is located in a PLMN.

21. A communication system as claimed in claim 19, wherein at least one of the access nodes is a radio network controller in a UMTS access network.

22. A communication system as claimed in any one of claims 14 to 21, wherein at least one of the endpoints is a wireless MS.

23. A communication system as claimed in claim 21 or 22, wherein the core network includes a UMSC for mapping messages into an Iu framing protocol for transport in the UMTS access network.

24. A communication system as claimed in any one of claims 8 to 23, wherein one or more of the access nodes is located in a fixed access network

25. A communication system as claimed in claim 24, wherein the fixed access network is a PSTN, ISDN, or a PSTN/ISDN access network.

26. A communication system as claimed in claim 25, wherein at least one of the endpoints is a fixed network terminal.

27. A communication system as claimed in claim 24, 25 or 26, wherein at least one of the access nodes is a transcoder forming part of the fixed access network.

28. An information rate control function means as claimed in any one of claims 1 to 6, 8 to 11, or 14 to 27, wherein the plurality of maximum information transmission rates are communicated across the core network as messages within I.366.2 Type 3 cells of an ATM AAL2 protocol.

29. An information rate control function means as claimed in any one of claims 1 to 5, 7, 8 or 12 to 27, wherein the plurality of maximum information transmission rates are communicated across the core network as messages within RTP packets of an IP protocol.

30. A telecommunications system including one or more access networks connected to a core network, first and second endpoints which communicate with each other via said access networks across said core network, information transmission to and from said first and second endpoints being respectively set by first and second telecommunications nodes, said first and second endpoints communicating with one of said access networks respectively across first and second interfaces, at least one of said interfaces having a variable maximum information transmission rate, wherein

said first and second telecommunications nodes respectively act to signal to a remote node the maximum information transmission rate able to be supported by said first and second interfaces, said remote node acting to compare the maximum information transmission rates that can be supported by said first and second interfaces, and wherein

the first and second telecommunications nodes respectively act to set the information transmission rate to and from said first and second endpoints to not exceed that of the lower of the maximum information transmission rates.

31. A first telecommunications node for use in a telecommunications system including a core network, one or more access networks connected to said core network, and a second endpoint, said first and second endpoints communicating with each other via said access networks across said core network, information transmission to and from said first and second endpoints being respectively set by first and second telecommunications nodes, said first and second endpoints communicating with one of said access networks respectively across first and second interfaces, at least one of said interfaces having a variable maximum information transmission rate, wherein

said first telecommunications node acts to signal to a remote node the maximum information transmission rate able to be supported by said first interface, said remote node acting to compare the maximum information transmission rates that can be supported by said first and second air interfaces, and wherein

the second telecommunications node acts to set the information transmission rate of said second endpoint to not exceed that of the lower of the maximum information transmission rates.

32. A method of authorising and/or establishing a communication rate for transmission of information in a telecommunication system having a core network and a plurality of access nodes in communication with the core network, including the steps of:

determining a plurality of maximum information transmission rates along a path of communication established between the plurality of access nodes;

selecting a lowest one of the plurality of maximum information transmission rates, and;

authorising and/or establishing communication at a rate no greater than the selected lowest rate.

33. A method as claimed in claim 32, wherein the step of authorising and/or establishing includes dynamically authorising and/or establishing communication at a rate no greater than the selected rate during a communication session.

34. A method as claimed in claim 32, wherein the step of authorising and/or establishing includes authorising and/or establishing communication at a rate no greater than the selected rate at, or prior to, set up of a communication session.

35. A method as claimed in claim 32, 33 or 34, further including the step of communicating the plurality of maximum information transmission rates across the core network as messages within I.366.2 Type 3 cells of an ATM AAL2 protocol.

36. A method as claimed in claim 32, 33 or 34, further including the step of communicating the plurality of maximum information transmission rates across the core network as messages within RTP packets of an IP protocol.

37. A communication system as claimed in any one of claims 8 to 29 operating in accordance with the method of any one of claims 32 to 36.

38. A method for controlling the rate of information transmission between first and second endpoints which communicate with each other via access networks separated by a core network, information transmission to and from said first and second endpoints being respectively set by first and second telecommunications nodes, said first and second endpoints communicating with one of said access networks respectively across first and second interfaces, at least one of said interfaces having a variable maximum information transmission rate, the method including the steps of:

(a) said first and second telecommunications nodes respectively signalling to a remote node the maximum information transmission rate able to be supported by said first and second interfaces;

(b) comparing the maximum information transmission rates that can be supported by said first and second air interfaces; and

(c) setting the information transmission rate of each endpoint to not exceed that of the lower of the maximum information transmission rates.

39. A method as claimed in claim 38, wherein the remote node signalled by each of said first and second telecommunications nodes is the other of said first and second telecommunications nodes.

40. A method as claimed in claim 38 or 39, wherein step (b) is performed in each of said first and second telecommunications nodes.

41. A method as claimed in claim 40, wherein at least one endpoint includes a codec.

42. A method as claimed in claim 41, wherein step (c) includes setting the rate of operation of the codec to the lower of the maximum information transmission rates.

43. A method as herein disclosed.

44. A system, network, protocol or device as herein disclosed.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 March 2001 (15.03.2001)

PCT

(10) International Publication Number
WO 01/18992 A1

(51) International Patent Classification[7]: H04B 7/005, H04L 29/02

(21) International Application Number: PCT/AU00/01070

(22) International Filing Date:
8 September 2000 (08.09.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
PQ 2741 9 September 1999 (09.09.1999) AU

(71) Applicant *(for all designated States except US)*: TELEFONAKTIEBOLAGET LM ERICSSON [SE/SE]; S-126 25 Stockholm (SE).

(72) Inventors; and

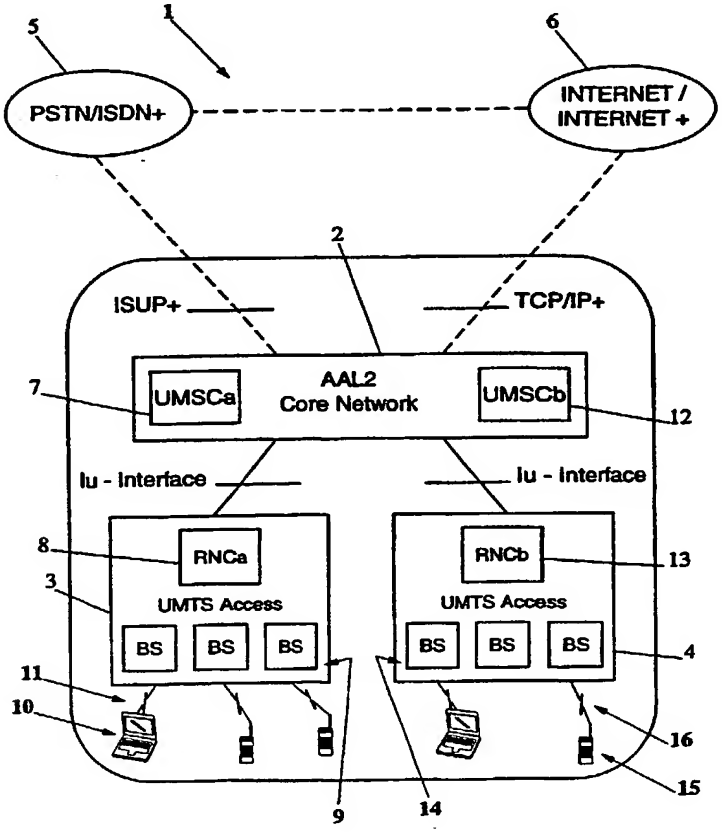
(75) Inventors/Applicants *(for US only)*: GRAF, Lesie, Gary [AU/AU]; 3 Hender Court, Balwyn, VIC 3103 (AU). GROVES, Christian, Norman [AU/AU]; 21 Garden Avenue, Keilor, VIC 3036 (AU). HOLLIS, Mark [AU/AU]; 1 Daintree Avenue, Park Orchards, VIC 3114 (AU). NOGUERA-RODRIGUEZ, Juan [ES/AU]; 348 Deakin Street, Essendon, VIC 3040 (AU). RYTINA, Ian [GB/AU]; 30/25 Barkley Street, Carlton, VIC 3053 (AU). TERRILL, Stephen, Christopher [AU/SE]; Hamacker, Flemingatan 45, 4tr. Stockholm (SE).

(74) Agent: WATERMARK PATENT & TRADEMARK ATTORNEYS; 290 Burwood Road, Hawthorn, VIC 3122 (AU).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,

[Continued on next page]

(54) Title: INFORMATION TRANSMISSION RATE CONTROL ACROSS A CORE NETWORK



(57) Abstract: The present invention relates to the information transmission rate between telecommunications nodes. More particularly, the invention relates to the control of the rate at which information is transmitted between access nodes separated by a core network. The present invention provides an information rate control function adapted to authorise and/or establish a communication rate for transmission of information including: determining a plurality of maximum information transmission rates along a path of communication established between the plurality of access nodes; selecting a lowest one of the plurality of maximum information transmission rates, and; authorising and/or establishing communication at a rate no greater than the selected lowest rate. The invention is suitable for use in the transmission of voice information to and from mobile terminals in third-generation mobile access networks across an ATM core network.

WO 01/18992 A1

Fig 1.

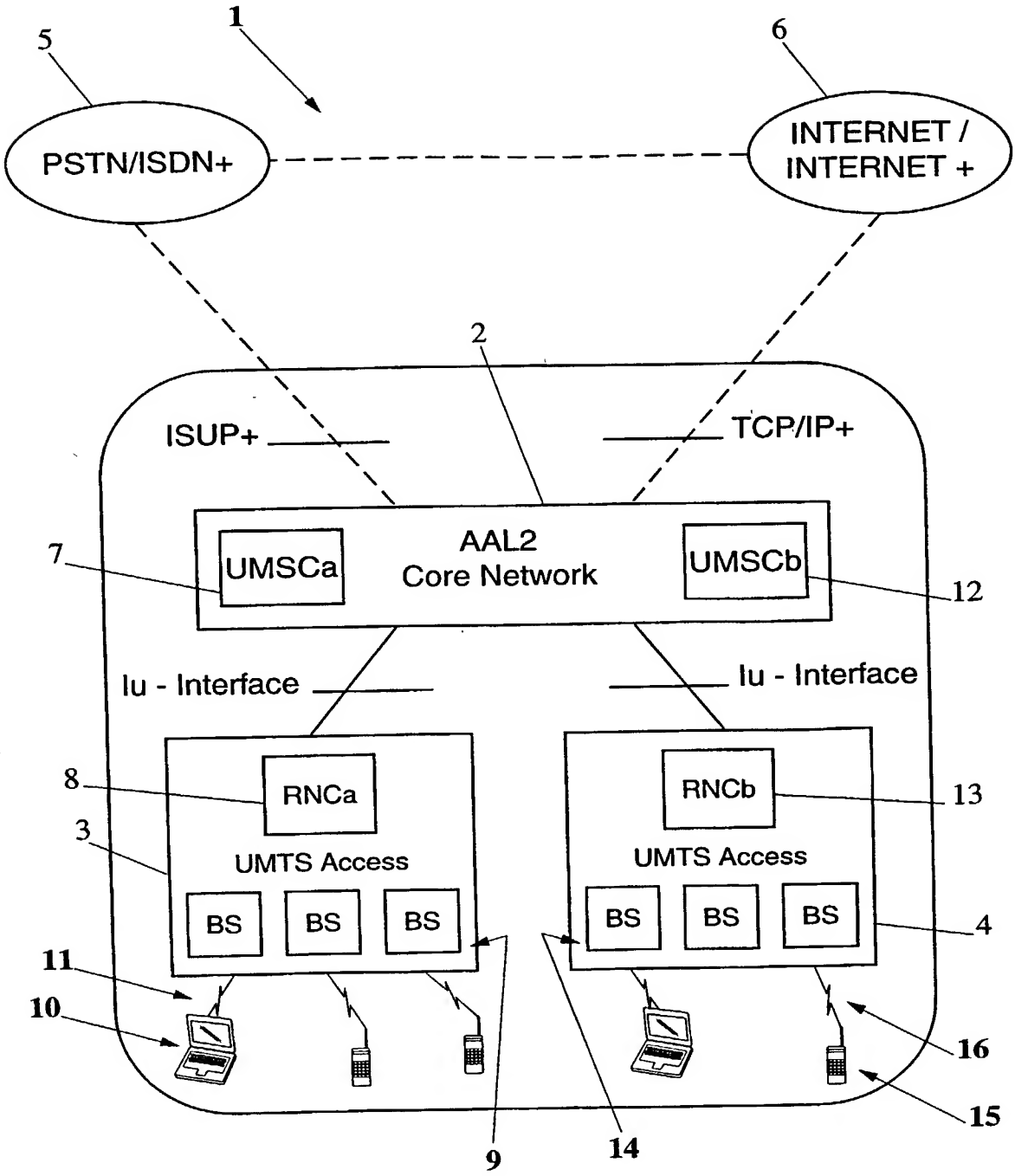

1
5
6
PSTN/ISDN+
INTERNET /
INTERNET +
2
ISUP+
TCP/IP+
7
UMSCa
AAL2
Core Network
UMSCb
12
Iu - Interface
Iu - Interface
8
RNCa
RNCb
13
3
UMTS Access
UMTS Access
BS
BS
BS
BS
BS
BS
4
11
10
16
15
9
14

Fig 2.

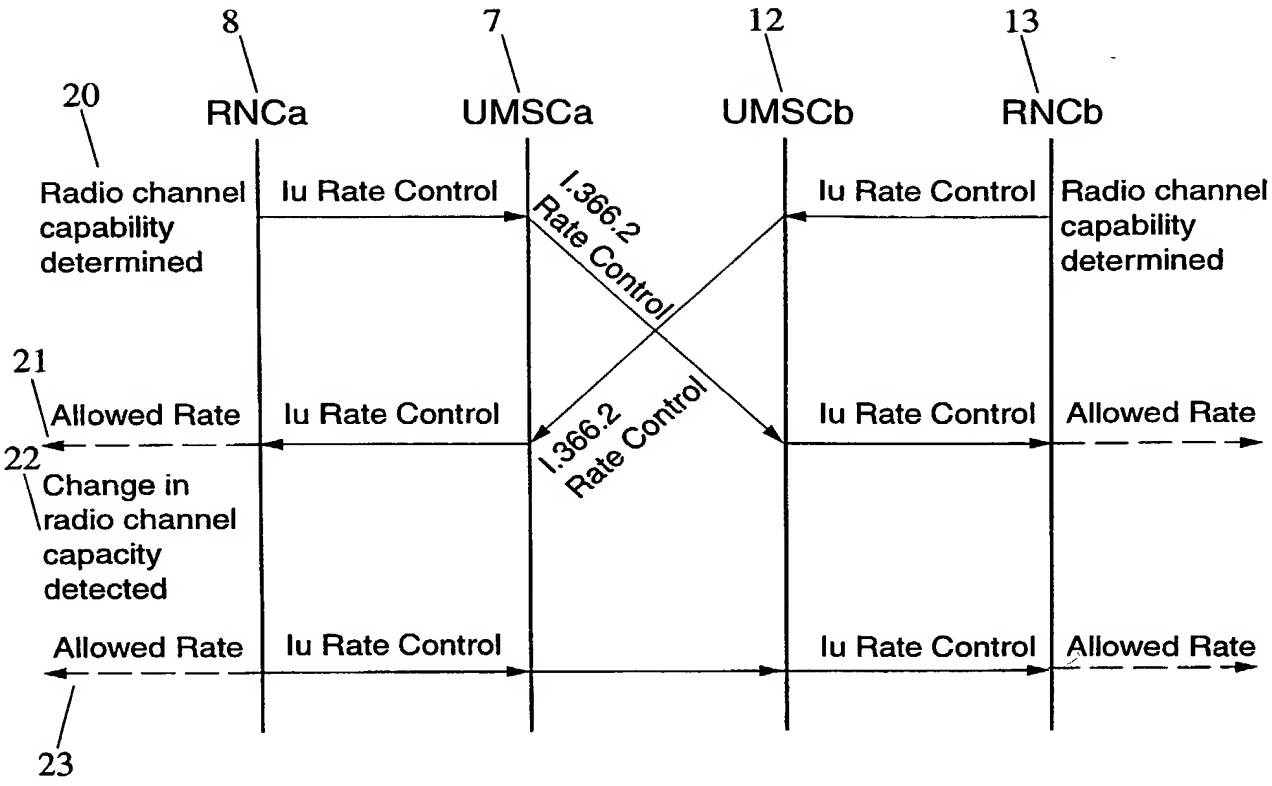
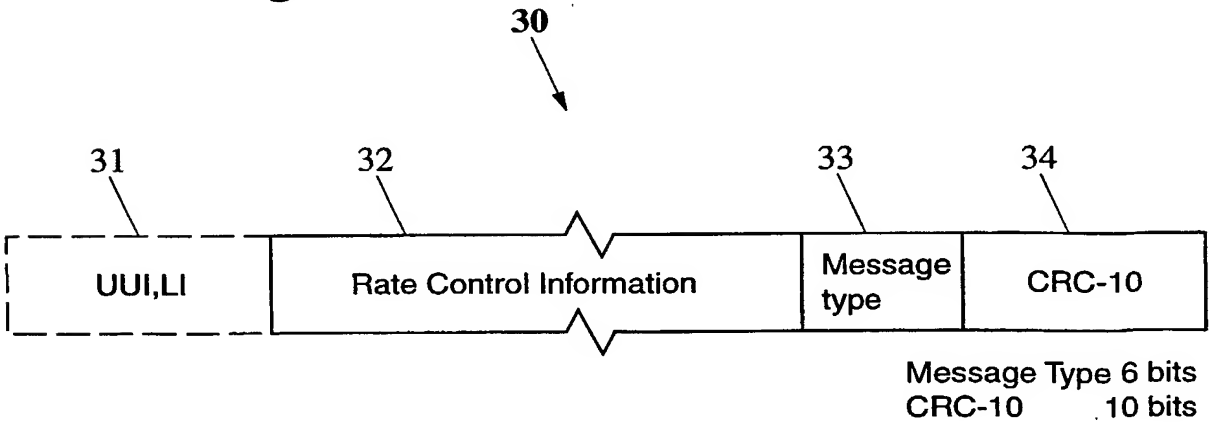


Fig 3.



PATENT APPLICATION
DOCKET NO.: _____

RULES 63 AND 67 (37 C.F.R. 1.63 and 1.67)
DECLARATION AND POWER OF ATTORNEY

FOR UTILITY/DESIGN/CIP/PCT NATIONAL APPLICATIONS

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Information Transmission Rate Control Across a Core Network
_____, the specification of which: (mark only one)

_____ (a) is attached hereto.

_____ (b) was filed on _____ as Application Serial No. _____ and was amended on _____ (if applicable)

__x__ (c) was filed as PCT International Application No. PCT/ AU00/01070 on 8 September, 2000 __ and was amended on _____ (if applicable).

_____ (d) was filed on _____ as Application Serial No. _____and was issued a Notice of Allowance on _____ _____.

_____ (e) was filed on _____ and bearing attorney docket number _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above or as allowed as indicated above.

I acknowledge the duty to disclose all information known to me to be material to the patentability of this application as defined in 37 CFR § 1.56. If this is a continuation-in-part (CIP) application, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability of the

application as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this CIP application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which my priority is claimed or, (2) if no priority is claimed, before the filing date of this application:

PRIOR FOREIGN PATENTS

Number	Country	Month/Day/Year Filed	Date first laid-open or Published	Date patented or Granted	Priority Claimed Yes	No
PQ2741	AU	09.09.1999			yes	

I hereby claim the benefit under 35 U.S.C. § 120/365 of any United States application(s) listed below and PCT international applications listed above or below:

PRIOR U.S. OR PCT APPLICATIONS

Application No. (series code/serial no.) Month/Day/Year Filed
Status(pending, abandoned, patented)

I hereby appoint:

TIMOTHY G. ACKERMANN, Reg. No. 44,493
THOMAS E. ANDERSON, Reg. No. 37,063
BENJAMIN J. BAI, Reg. No. 43,481
MICHAEL J. BLANKSTEIN, Reg. No. 37,097
MARY JO BOLDINGH, Reg. No. 34,713
MARGARET A. BOULWARE, Reg. No. 28,708
ARTHUR J. BRADY, Reg. No. 42,356
MATTHEW O. BRADY, Reg. No. 44,554
DANIEL J. BURNHAM, Reg. No. 39,618
THOMAS L. CANTRELL, Reg. No. 20,849
RONALD B. COOLLEY, Reg. No. 27,187
THOMAS L. CRISMAN, Reg. No. 24,846
STUART D. DWORK, Reg. No. 31,103
WILLIAM F. ESSER, Reg. No. 38,053
ROGER J. FRENCH, Reg. No. 27,786
JANET M. GARETTO, Reg. No. 42,568
JOHN C. GATZ, Reg. No. 41,774
RUSSELL J. GENET, Reg. No. 42,571

37

J. KEVIN GRAY, Reg. No. 37,141
STEVEN R. GREENFIELD, Reg. No. 38,166
J. PAT HEPTIG, Reg. No. 40,643
SHARON A. ISRAEL, Reg. No. 41,867
JOHN R. KIRK JR., Reg. No. 24,477
PAUL R. KITCH, Reg. No. 38,206
TIMOTHY M. KOWALSKI, Reg. No. 44,192
HSIN-WEI LUANG, Reg. No. 44,213
JAMES F. LEA III, Reg. No. 41,143
ROBERT W. MASON, Reg. No. 42,848
ROGER L. MAXWELL, Reg. No. 31,855
ROBERT A. McFALL, Reg. No. 28,968
STEVEN T. McDONALD, Reg. No. 45,999
LISA H. MEYERHOFF, Reg. No. 36,869
STANLEY R. MOORE, Reg. No. 26,958
RICHARD J. MOURA, Reg. No. 34,883
MARK V. MULLER, Reg. No. 37,509
P. WESTON MUSSELMAN JR. Reg No. 31,644
DANIEL G. NGUYEN, Reg. No. 42,933

SPENCER C. PATTERSON, Reg. No. 43,849

(17)

RUSSELL N. RIPPAMONTI, Reg. No. 39,521
STEPHEN G. RUDISILL,, Reg. No. 20,087
HOLLY L. RUDNICK, Reg. No. 43,065
J.L. JENNIE SALAZAR, Reg. No. 45,065
KEITH W. SAUNDERS, Reg. No. 41,462
JERRY R. SELINGER, Reg. No. 26,582
GARY B. SOLOMON, Reg. No. 44,347
WAYNE O. STACY, Reg. No. 45,125
STEVE Z. SZCZEPANSKI, Reg. No. 27,957
ANDRE M. SZUWALSKI, Reg. No. 35,701
ALAN R. THIELE, Reg. No. 30,694
TAMSEN VALOIR, Reg. No. 41,417
RAYMOND VAN DYKE, Reg. No. 34,746
BRIAN D. WALKER, Reg. No. 37,751
GERALD T. WELCH, Reg. No. 30,332
HAROLD N. WELLS, Reg. No. 26,044
WILLIAM D. WIESE, Reg. No. 45,217

all of the firm of **JENKENS & GILCHRIST, P.C.**, 3200 Fountain Place, 1445 Ross Avenue, Dallas, Texas 75202-2799, as my attorneys and/or agents, with full power of substitution and revocation, to prosecute this application, provisionals thereof, continuations, continuations-in-part, divisionals, appeals, reissues, substitutions, and extensions thereof and to transact all business in the United States Patent and Trademark Office connected therewith, to appoint any individuals under an associate power of attorney and to file and prosecute any international patent application filed thereon before any international authorities, and I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization who/which first sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct them in writing to the contrary.

Please address all correspondence and direct all telephone calls to:

Stanley R. Moore
Jenkens & Gilchrist, P.C.
3200 Fountain Place
1445 Ross Avenue
Dallas, Texas 75202-2799
214/855-4500 214/855-4300 (fax)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAMED INVENTOR(S)

1-OP Leslie Gary Graf | L. Graf | Date

Full Name | **Inventor's Signature**

3 Hender Court, Balwyn. Victoria 3103. Australia

Residence (city, state, country)

Citizenship Australian AUX

62 Carlton Street, Carlton. Victoria 3053. Australia.

Post Office Address (include zip code)

2-02 Stephen Christopher Terrill	Stephen C Terrill	28/2/2002
Full Name	**Inventor's Signature**	**Date**

Hamacker, Flemingatan 45, 4tr., S-112 32 Stockholm. Sweden.

Residence (city, state, country)

Citizenship Australia AUX

Hamacker, Flemingatan 45, 4tr., S-112 32 Stockholm. Sweden.

Post Office Address (include zip code)

3 Hender Court, Balwyn. ?Victoria 3103. Australia.

Post Office Address (include zip code)

3-00 Christian Norman Groves		6/3/2002
Full Name	**Inventor's Signature**	**Date**

48 Percy Street, Newport. Victoria 3015. Australia

Residence (city, state, country)

Citizenship Australian AUX

48 Percy Street, Newport. Victoria 3015. Austrlaia.

Post Office Address (include zip code)

4-00 Mark Alan Hollis		6/3/2002
Full Name	**Inventor's Signature**	**Date**

1 Daintree Avenue, Park Orchards. Victoria 3114. Australia.

Residence (city, state, country)

Citizenship Australian AUX

1 Daintree Avenue, Park Orchards. Victoria 3114. Australia

Post Office Address (include zip code)

5-00 Juan Noguera-Rodriguez		28/3/02
Full Name	**Inventor's Signature**	**Date**

Faltmarkskalksvagen 16, 16732 Bromma. Sweden.

Residence (city, state, country)

Citizenship Spanish ESX

Faltmarkskalksvagen 16. 16732 Bromma. Sweden.

Post Office Address (include zip code)

6-00 Ian Rytina		6/3/2002
Full Name	**Inventor's Signature**	**Date**

62 Carlton Street, Carlton. Victoria 3053. Australia

Residence (city, state, country)

Citizenship British DEX